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Six School Readiness Screening Devices Used in Pediatric Offices: Concurrent Validity. Final Report.

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This study is phase one of a 4-year project. It was aimed at examining the predictive validity of six preschool screening instruments on later academic achievement. The six instruments were (1) the Stanford-Binet Intelligence Test, (2) the Sprigle School Readiness Screening Test, (3) the Anton Brenner Developmental Gestalt Test of School Readiness, (4) the School Readiness Check List (the "Ready or Not" test), (5) the School Readiness Survey, and (6) the Child Study Unit Screening Scales. Informal ratings were also made by pediatricians. This phase of the project involved the initial screening of 100 preschoolers on the six tests. The tests were administered at two pediatric offices. The test results indicated that the instruments had a moderate to high relationship with the chronological age and mental age of the children and also a high correlation among themselves. However, some of the tests have a limited age range. Subsequent phases of the project will follow these subjects and compare their academic achievement to their screening test results. (WD)

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SIX SCHOOL READINESS SCREENING DEVICES USED IN PEDIATRIC OFFICES:

CONCURRENT VALIDITY

FINAL REPORT
Project No. 7-1-006

Keith E. Beery, Ph.D.

September 1967

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INTRODUCTION

This is a report of the initial phase of a four-year project in which the predictive validity of six preschool screening instruments which might be used in a physician's office or elsewhere by relatively untrained personnel was examined. One hundred preschool children were screened on these instruments through pediatricians' offices. They will be followed for the next three to four years so that their subsequent academic achievement can be compared to the original screening results. This is a report of original screening results (concurrent validity).

There has been a clear recognition of the importance of early experience in relationship to intelligence and learning (Hunt, 1961). Furthermore, evidence is accumulating to justify the presumption that early identification and remediation of developmental deficiencies is an effective preventive procedure. Kirk (1958), for example, selected four groups of educable mentally retarded children (ages three to six), provided one group with six hours per day of enriched nursery school environment in the community prior to school entrance, provided a second group with similar experience in an institution, and formed contrast groups for these two experimental groups. Both of the experimental groups made significantly greater gains in IQ's and SQ's on the Binet, Kuhlmann, and Vineland tests than did the contrast groups.

Project Head Start has, of course, recently facilitated a vast acculumulation of data to support the notion that early identification and remediation of culturally disadvantaged children promotes intellectual and educational growth. One of the early projects in this area was reported by Weaver (1963), who found than ten weeks of summer training for culturally disadvantaged Negro

children led to IQ changes in favor of the experimental groups of as much as ten points. On the basis of subsequent testing on the Illinois Test of Psycholinguistic Abilities, the experimental groups surpassed the control group in the ability to comprehend visual information (Visual Decoding) and to associate auditory information with verbal expression (Auditory-Vocal Association). The results of such attempts to provide early remediation have not been consistently positive, but the weight of evidence and expert opinion is in the direction of greater efforts for even younger children. Many feel that we may have to begin language programs as early as eighteen months of age.

The concept of prevention in the area of learning disabilities is a compelling one with a great deal of face validity for a pediatrician. In the midst of a rapidly increasing emphasis upon special education in this country, the pediatrician is experiencing increasing demands by schools and other educationally-oriented agencies upon his knowledge of theearly development of children with whom they are concerned. He is often the only professional person with whom the child has contact prior to school age. Pediatricians in large numbers are seeking more adequate means of identifying and describing the developmental characteristics of their young patients insofar as learning capabilities are concerned.

Many pediatricians have begun to use a variety of psychological test items, such as the drawing of a human figure, during their physical checkups of preschool children. It appears that, in most cases, the selection and administration of the items have been haphazard. Furthermore, the physician does not know how to interpret his results because his "tests" lack norms or obvious relatedness to models for either evaluation or treatment. Even if the pediatrician had an instrument that was well organized, standardized, and validated for predictive purposes, he would rarely have time to administer it himself. Undoubtedly, he would have

to have a screening instrument which could be used by his nurse or some other relatively untrained person. The instrument would have to be easy to administer, but it would also have to be brief if the busy office nurse were to administer it.

Because of the absence of instruments to assist the pediatrician and others, such as nursery school teachers, in the area of preschool screening for learning disorders, a vacuum exists which may be filled inappropriately. It would appear to be none to early to examine available instruments and improve upon them if possible.

The Sprigle School Readiness Screening Test (Sprigle, 1965) is the one instrument specifically designed for use by pediatricians. It is said to take 8 to 12 minutes for a nurse to administer. Norms based on 475 preschool children classify the children into three levels of readiness: "not ready", "average to above average", and "accelerated". Norms are available for each of the age groups, 5 to $5\frac{1}{2}$, $5\frac{1}{2}$ to 6, and 6 to $6\frac{1}{2}$ years. Extremely high correlations between the results of the screening test obtained at kindergarten entrance and the following are reported by the authors: a) The Stanford-Binet Intelligence Quotient at the time of screening, b) school readiness as measured by the Metropolitan Readiness Test at the end of kindergarten, and c) reading achievement as measured by the Gates Primary Reading Test (paragraph reading) at the end of first grade.

The Anton Brenner Developmental Gestalt Test of School Readiness (Brenner 1964) was not deviced specifically for use by pediatricians, but the fact that the average time of administration is stated to be five minutes (range of 3 to 10 minutes) would appear to make it a likely candidate for use as a preschool screening device by the pediatrician. It is said to be predictive of reading

and number readiness for children between the ges of 4-3/4 and 7 and to have value in the assessment of emotional disturbance in some preschool and lower elementary school children.

The School Readiness Check List (Austin and Lafferty, 1963), commonly referred to as the "Ready or Not", is a check list of forty-three items designed for parents to "help in appraising readiness for school". All items can be answered yes or no. The authors do not state that this check list is intended for use as a pediatric device, but pediatricians may look to this instrument for guidelines in evaluating preschool readiness, especially since the "screening" is done outside office time by the parent. This instrument appears to show some promise and to deserve further attention.

The School Readiness Survey (Jordan and Massey, 1967) is a very recent scale designed for parents. The SRS is made up primarily of test items, however, which are administered and scored by the parents. There are eight subsections of the SRS: number concepts, discrimination of form, color naming, symbol matching, speaking vocabulary, general information, and a general readiness check list. The scale has been standardized on 842 children who were screened in the spring prior to kindergarten entrance. Insufficient data is reported for the SRS (or for Austin and Lafferty's School Readiness Check List) to indicate how valid the parents' ratings are in comparison to a trained, objective observer. This is obviously an important question which needs to be answered.

There is also an apparent need to examine the possibility that early identification and prevention among general populations can be achieved prior to entrance into kindergarten. The vast majority of efforts to develop school readiness scales for these purposes have, like the four instruments mentioned

above, been directed toward the kindergarten age level. The work of de Hirsch (1966) is particularly noteworthy in this area, and there are a large number of other contributions of significance (Barrett, 1965; Beery, 1966; Buktenica, 1966; Castner, 1935; Chall, Roswell, Alshan, and Bloomfield, 1965; Cohen, 1963; de Hirsch, 1957; Harrington and Durrell, 1955; Hoenig, 1949; Ilg and Ames, 1964; Hermoian, 1962; Koppitz; Mardis, Verdina, and Stephans, 1961; Koppitz, Sullivan, Blyth, and Shelton, 1959; Melquist, 1963; Martin, 1955; Mitchell, 1962; Monroe, 1935; Petty, 1939; Pratt, 1949; Simon, 1952; Tauber, 1966-67; Thompson, 1963; Weiner and Feldmann, 1963).

There is relatively little time to work with children who are experiencing difficulties between the time that they enter kindergarten and the time that formal reading and other instruction begins in most school systems. Even the beginning kindergarten requirements for listening, looking, manipulating materials, etc., are too advanced for many children in normal kindergartens and the pattern of failure has begun before they are asked to open a book. It is quite possible that the optimal times to assist children in the "readiness" areas which promote success in school is prior to kindergarten entrance. Some are convinced, although there is lack of research in this area, that such screening and assistance can be carried out with children at least as young as three and one-half years of age and that the provision of longitudinal data on children prior to their entrance into public kindergarten will facilitate development of improved primary curricula (Beery, 1966). There are efforts currently being made to begin remedial programs at 18 months of age or younger.

In recognition of the apparent need for preschool screening instruments which would be applicable to children below kindergarten age the Child Study Unit Screening Scales are currently under development at the University of California

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Medical Center, San Francisco. These scales will encompass norms from the ages of $2\frac{1}{2}$ through $6\frac{1}{2}$ years so that the battery may be useful for children at least as young as $3\frac{1}{2}$ years of age. Items within each of the scales are ordered according to the average chronological age at which they were passed, so that approximate age levels of functioning may be ascertained. This feature is important to remedial planning and is absent in existing instruments. In keeping with contemporary theory, research, and experience in regard to learning disabilities (Bateman, 1967), the scales attempt to systematically assess the major input, integrative, and output systems related to information processing. The present scales include:

Auditory Processing - recognition of the meaning of words spoken

Visual Processing - recognition of differences and similarities among visual stimuli

Auditory-Vocal Integration - vocal reproduction of auditory stimuli

Motor Processing - coordinational movement of the hands

Vocal Processing - expressive vocabulary

In summary, there is an apparent need to explore ways of screening large numbers of children at early ages for potential learning disorders. One possible way to go about doing this is for public schools to invite preschool children to the schools for screening by teachers (Beery, 1967). Another possibility, if brief, easy to administer, and valid instruments can be devised, is that of having pediatric nurses, nursery school teachers, and others who come into contact with large numbers of preschool children, do the screening. Although professionals tend to come into contact with a biased sample of children (middle and upper class), it is conceivable that they might organize special screening programs which could

reach most of the children in a community. There is also an important possibility that parents can provide da' hich is reliable and valid for purposes of identifying children with potential disabilities at an early age. Regardless of the method for obtaining data. reliable and relevant instruments must be used for the data to be of value. This study is an attempt to provide information regarding the validity of several instruments which might be used for these purposes.

METHOD

Subjects were obtained from and tested in two separate pediatric offices in Marin County, California. Each of the two pediatric offices was staffed by three pediatricians, all of whom were well established in the community. Marin County is populated primarily by middle and upper middle class families.

Each pediatric office assistant selected ten boys and ten girls in each of five age groups, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, 5, and $5\frac{1}{2}$ years of age. The assistants were instructed to list an approximately equal number of children from the beginning, middle, and ending sections, according to alphabetical order of last name, and according to physician. Thus, a total of 200 perspective subjects were garnered, 100 from each of the two offices.

Letters and questionnaires were then sent out to the parents of each of the children (appendices A and B). On the basis of the returned questionnaires, five boys and five girls from each office in each of the five age groups were selected as subjects for the study. Criteria for selection were:

a. equal distribution of males and females for each age group in each office

b. an equal number of subjects from each of the six physician's lists

c. future family residence in the county anticipated to be four years or more

Although the questionnaire contained information related to socio-economic status of the family, number of siblings and other potentially important variables, application of the three major criteria named above effectively exhausted the subject sample so that these "secondary" variables were not controlled in any systematic fashion.

There were three phases or aspects of data collection:

1. Parents' Screening: The "Ready or Not" and SRS instruments were mailed to the participating parents from one of the pediatric offices before they were to come to the office for their first appointment. Parents were asked to complete the instruments and to return them at the time of their first appointment. These instruments were made available to the parents from the second pediatric office at the time of their first appointment. This procedure was followed so that one half of the parents would administer the parents' screening instruments before their child was seen for other forms of screening, while the other half would complete the screening instruments after the child had been seen for other forms of screening, and so that practice effects on scales that were administered twice would be counter-balanced. An experienced psychologist administered the SRS to the children in the $4\frac{1}{2}$, 5, and $5\frac{1}{2}$ year age groups so that concurrent validity of the parents' administration of the scale could be statistically evaluated.

2. Pediatric screening: Pediatric office nurses made two appointments for each of the subjects, one for pediatric screening, and one for psychological examination. Half of the children had their pediatrics screening during the first appointment, and the other half of the children had their psychological examination during the first appointment. The pediatric screening was composed of two parts. The child was first seen by the nurse (by an office assistant in one office) during this phase of the screening. All of the children were screened with the Child Study Unit (CSU) screening scales. In addition, all of the girls in the $4\frac{1}{2}$, 5, and $5\frac{1}{2}$ age groups at one office were screened on the Sprigle, and all of the girls at the other office were screened on the Brenner.

All of the boys were screened on the Brenner at the first office, and on the Sprigle at the second office. Following this phase of the pediatric screening, the children were then seen by the physician for a preschool physical examination. At one of the offices, the three pediatricians completed a rating scale for prediction of school readiness in the course of their examination (Appendix C).

3. Psychological Examination: Each of the children was seen by an experienced psychological examiner. This examiner administered the Stanford-Binet (LM) Intelligence Test. The SRS was administered to children with chronological ages of 4½ or more. Parents were allowed to observe the psychological examination.

RESULTS AND DISCUSSION

Results on all of the instruments administered were intercorrelated (Pearson) by subscales for each half-year age group, for each sex, and for various combinations of these groups. Means and standard deviations on all variables were similarly computed. It will be noted that data are not available on children below the age of 4½ on the Brenner, Sprigle, the Ready or Not, and the SRS, because these instruments are limited in use to children at or above the chronological age of 4½ years.

Age

The means and standard deviations by age group, sex, and total sample are shown on Table 1. The average age for each of the groups is almost identical to that desired. For example, the 3½ year old males in this sample averaged 42.4 months in age, and over two-thirds of these subjects were within 1½ months of that mean age.

Mental Age and IQ

The means and standard deviations for Stanford-Binet (LM) mental age are shown, by age group, sex, and total sample in Table 2(a) and IQ results are shown in Table 2(b). Mean mental ages for all groups were higher than chronological ages. For the total group, mental age exceeded chronological age by 8.6 months, and the average IQ for the total group was approximately 115, or "high average". The average mental age for females exceeded that of males in four of the five groups, but in only one case was the difference statistically significant beyond the .05 level of confidence. For the total sample, the average mental age for females exceeded that of males by 1.9 months.

Brenner

The means and standard deviations for the Brenner are given by age group, subscale, and Brenner total score (BGT) in Table 3(a). The subscale scores are difficult to interpret because norms for these subscales are not available. The only norms given for the Brenner are for the BGT. It appears that there is a developmental progression within each of the subscales, as the mean score increased in all cases for each successively older age group. This was also true of the BGT score. The Brenner provides no norms for children as young as 4½ years of age, so that the mean score of 21.4 for the 4½ year olds is relatively uninterpretable. The mean score of 44.7 for the 5 year olds would apparently place this group in the third quartile (or average) range on the Brenner. The same classification would be made for the 5½ year olds. This classification would seem to be in keeping with the "high average" results obtained on the Stanford-Binet. No statistically significant difference was found by age group or total sample between males and females on the Brenner.

Intercorrelations between the total number of items correct on the Brenner by subscale and other results, including chronological age and pediatricians' ratings (based only on their observation of children during the physical examination) are shown in Table 3(b). Relatively high correlations were obtained between the Brenner total scores and chronological age (.72), mental age (.74), and the CSU scale total (.75). It corresponded less well with the Ready or Not (.42), the SRS as given by parents (.61), and the predictions for academic, social, and total development by pediatrician (.26, .30, .49). Whether a simple sum of correct items or the more complicated BGT scoring was used, total score correlations were essentially identical. Among the subscales, the 10 Dot Gestalt,

which is the copying with a pencil of a 10 dot pattern, and the Sentence Gestalt, which is the copying of a three word sentence by pencil, seemed most highly related to chronological age. The Sentence Gestalt was most highly related to mental age (.65) and to the Visual-Motor Integration subscale on the CSU (.66). Interestingly, there was an inverse correlation between the child's ability to produce the 10 Dot Gestalt and the pediatricians' predictions, but a high correlation (.60) between the pediatricians' predictions and the Sentence Gestalt was obtained.

CSU Scales

The means and standard deviations for the CSU Screening Scales by age, subscale, and total are given in Table 4(a). Except among the 4 year old group, sex differences were not significant. Females scored more highly than males on the two integration scales and on the total score among 4 year old subjects. Although there was a clearcut age progression within the total CSU scores and several of the subscales, this progression was not clear in other subscales, particularly the Auditory and the Auditory-Vocal subscale. In the latter subscales, children between the $3\frac{1}{2}$ and $4\frac{1}{2}$ year levels in this sample performed at approximately the same level. These findings would seem to suggest either (a) the scales are not differentiating adequately where real differences exist between $3\frac{1}{2}$ and $4\frac{1}{2}$ year olds, or (b) the scales are reflecting an actual lack of differences in these abilities for this sample. The fact that both the $3\frac{1}{2}$ and 4 year old group scored considerably higher than the norms on these two subtests for their ages and the fact that both scales emphasize auditory abilities, may suggest that "above average" children make accelerated gains in auditory information some time prior to the $3\frac{1}{2}$ year old level, but do not make a great deal of progress again until they are about 5.

With the exception of the 4½ year group, the age samples scored above the norms for the total CSU score, in keeping with the "above average" categorization of the samples by the Stanford-Binet. Nine out of twenty 4½ year old children had 63 points or more on the CSU total scale, thereby qualifying them as "average" for kindergarten readiness according to the tentative CSU cutoff score.

Intercorrelations for the CSU subscales, total score, and other instruments are shown in Table 4(b). Relatively high correlations were obtained between the total CSU score and CA (.68), MA (.77), the CSU subscales, and total scores on the other instruments. A surprisingly high correlation (.76) was obtained between the total CSU scale scores and the total score on the pediatricians' ratings.

In general, the CSU subscales correlated highly with the total CSU score and less highly with one another, as should be the case in batteries which attempt to measure relatively discreet abilities. The magnitude of the subscale intercorrelations would seem to suggest that the Auditory subscale was most highly related to the Vocal subscale; the Visual subscale was moderately related to all other subscales; the Auditory-Vocal subscale was moderately related to all other subscales; the Visual-Motor subscale was most highly related to CA, MA, and the Auditory subscale; the Vocal subscale was most highly related to MA, the Auditory subscale, and the Total CSU score; and the Motor subscale was most highly related to CA and MA and moderately related to all other CSU subscales.

The Brenner BGT score was moderately related to all CSU subscales and was most highly related to the Visual-Motor and the Motor subscales, as might be anticipated because of the preponderance of pencil and paper tasks in the Brenner. The Sprigle total score was rather highly correlated with all of the CSU subscale

scores, particularly the Vocal subscale. The Ready or Not total score had low correlations for the Auditory and Visual subscales on the CSU and was most highly related to the Auditory-Vocal subscale and the Motor subscale. Similarly, the SRS total score had relatively low correlations with the CSU Auditory and Visual subscales and was most highly related to the Motor subscale. The physicians' prediction of academic achievement was most highly related (.66) to the CSU Motor subscale. The physicians' predictions of social adjustment had low correlations with all subscales on the CSU.

Ready or Not

The means and standard deviations of Ready or Not results are given in Table 5(a) by age group and by sex. According to the criteria given in the Ready or Not booklet, the readiness of each of the groups except the $4\frac{1}{2}$ year old boys is rated at least as "Very Probable". The $4\frac{1}{2}$ year old boys, as a group, would be rated as "Readiness Questionable". In general, the scores of both sexes increase by age group, although the mean scores are only from 0.4 to 6.1 points different between age groups. When sexes are combined, there is only a 5.5 point differences between the $4\frac{1}{2}$ year olds and the $5\frac{1}{2}$ year olds. Table 5(b) shows the correlations between Ready or Not results and other results. The Ready or Not does not provide subscale norms, although the 43 items are divided under the headings of Growth and Age, General Activity Related to Growth, Practical Skills, Remembering, Understanding, General Knowledge, and Attitudes and Interests. The Ready or Not total score was most highly related to the Sprigle (.75), the SRS (.73) and MA (.66). Of the CSU subscales, it was most highly related to Motor (.51) and the Auditory-Vocal (.55). It was least highly related to the CSU Auditory (.26) and Visual (.28), which would seem to suggest that the Ready or Not

input or decoding functions to a lesser extent than output and integrative functions, particularly motor and auditory-vocal. In general, the Ready or Not may be more discriminating of girls than of boys in view of the relatively higher correlations for girls on the Binet, Sprigle, and pediatricians' ratings.

School Readiness Survey

Means and standard deviations for SRS results are shown in Table 6(a). Although the mean differences between age groups on subtest scores were small, there was consistency of age discrimination on all scales for all groups. There was a 14.5 point difference in total scores between the $4\frac{1}{2}$ and $5\frac{1}{2}$ year old groups (sexes combined). The major differentiation of age groups seemed to occur between chronological ages of $4\frac{1}{2}$ and 5, as there was a difference of 10.9 points between these two groups. Intercorrelations of the SRS subscales and total scores with one another and with other results are shown in Table 6(b). Of the other instruments, the SRS total score was most highly related to the Sprigle (.77), the Ready or Not (.73), and MA (.71). These relationships seem to be due, in large part, to commonalities associated with the subtests General Information and Symbol Matching. General Information correlated .91 and Symbol Matching correlated .88 with the SRS total score, and also correlated most highly with MA, the Sprigle, and the Ready or Not. The SRS total score correlated moderately with all CSU subscales, except Visual (.21), so that it may be that the SRS is highly saturated with a general intellectual factor. Correlations between the SRS and the CSU subtests indicated that Number Concepts was highly related to Motor (.71). Correlations with input or decoding functions tended to be lower than with output or integration functions. In general, there was logical consistency in the relative degrees of relationship.

The Sprigle

The means, standard deviations, and statistically significant differences between sexes for results on the Sprigle are shown in Table 7(a) by age group, sexes combined. It will be noted that, although there is a tendency for subscale scores to increase with age, there is practically no difference between mean scores for the different age groups. Less than one point difference was obtained even on the total score between the 4½ and 5 year old age groups. A 5.5 point mean difference was obtained between the 5 and 5½ year old age groups. Total scores for each of the three age groups are categorized by the Sprigle manual norms as ranging from "above average" to "accelerated" or "superior" in readiness and mental development. Intercorrelations among the Sprigle subscales, total score, and other measures are shown in Table 7(b). The total score correlated .60 with CA, .80 with MA, and .54 with IQ. The total score correlated relatively well with the total scores of other instruments in the study, including the pediatricians' rating scale. The Sprigle total score correlated most highly with Vocal (.66) of the CSU scales, but correlated about .55 on the average with the other subscales (suggesting that it is testing, to a large extent, general ability with some emphasis on a verbal factor). However, Understanding of Numbers, which requires verbalization of responses, was the most highly related of the Sprigle subtest scores to the Sprigle Total Score. This subscale correlated highly (.69) with the CSU Motor subscale. The Sprigle Vocabulary subscale had relatively low and some inverse correlations with other subscale and total scores.

Pediatricians' Ratings

A total of 25 children, 12 boys and 13 girls, in the 4½ through 5½ year old groups were rated by the physicians in one of the offices during the course of

preschool physical examinations. These ratings were made without benefit of information from any of the instruments used in this study. The results of these ratings, for boys and girls combined, are shown in Table 8(a). It would appear that none of the subcategories of Item #1, Laterality, will be of any predictive value, as they are about equally divided between passing and failing among a sample which seems highly unlikely to have more than 15 or 20 percent "high risk" cases. Similarly, Items 6 and 8 do not appear to have predictive potential because of the infrequency of poor ratings. Some degree of <u>over</u>-identification of potential risks would seem to be preferable to under-identification in screening programs. Items 2, 3, and 7 may underestimate somewhat, but may be rather accurate as predictors. The rating of "Poor" on Items 4 and 5 would seem at this point, however, to be the best candidates for predictive screening, even though they are likely to over-estimate. The Total Score may also prove to have some value as a predictor.

Comparison of results for Males, shown in Table 8(b), and for Females, shown in Table 8(c) indicates that the boys were not only some 10 points lower on the Total Score than girls, but were lagging in all of the motor items. These sex differences cannot be explained by age differences, although the presence of one more $4\frac{1}{2}$ and two less $5\frac{1}{2}$ boys than girls may have increased the direction of the differences.

Pearson product moment correlation coefficients among the Pediatric Rating subscales, total score, and results from other instruments are shown in Table 8(d) for all 25 subjects rated, sexes combined. It should be noted that the Pearson r coefficient is technically an inappropriate statistical measure for most rating scale data. It was convenient to insert the rating scale variables in the

correlation matrix, however, and since the number of subjects is fairly large and relative rather than exact magnitudes of relationships were sought on these variables, the statistic was used. The Pediatric Rating total score correlated more highly with MA than with CA, and correlated even more highly with the CSU and Sprigle total scores, the CSU Vocal subscale, and the CSU Motor subscale. It would seem that most of the Pediatric items contributed about equally to the Pediatric Total Score, although #5 (Eye Wink) and #8 (Prediction of Social Adjustment) were less highly related. Prediction of Social Adjustment had relatively low relationships to most variables in the matrix of results, and may have been an artifact of intelligence, as its highest relationships were with MA, IQ, the Sprigle, and the Pediatricians' prediction of academic success. Eye Wink had relatively low relationships to almost all variables, and had a correlation of zero with CA.

Pencil grasp had relatively high relationships to CA, MA, and the total scores of the other screening instruments. The Pediatricians' predictions of Academic Success had little relationship to CA, moderate relationships with MA, IQ, and most other variables, and relatively high relationships to the CSU Motor subscale and the Sprigle total score.

Relatively high relationships were obtained among the four laterality items; essentially, they seemed to be redundant, with the cross-lateral tasks being somewhat more difficult, and, perhaps, discriminating.

Proportions of Unready Cases

The number and portion of children classified by each screening instrument as being "unready" are shown in Table 9. The proportions of children so classified ranged from a low 4% on the Sprigle, to a high of 22% on the CSU Screening Scales. On the average, the six instruments classified 13% of the children as having

questionable readiness. Since estimates of the incidence of learning disabilities tend to range from 10% to 20% of the population and the incidence may be independent of socio-economic status, any screening scale which identifies less than 15% of mostpopulations as having questionable readiness might lack the required sensitivity for screening. Short of devising perfect screening instruments, i.e., those which would identify every child who will have difficulty without identifying a single child as unready who would in fact do well in school, it would seem to be better to select instruments which will err on the side of identifying too many rather than too few children. This is a value judgment, to be sure, but it would seem better to run the risks of creating some temporary anxiety among a few parents of children who will not encounter difficulties than to miss the opportunity to identify and assist children who will, in fact, have difficulty unless they receive special help early in their lives. On the basis of this reasoning, it would seem that the Brenner and CSU scales are the most appropriate screening instruments of those used in the study, although this judgment can only be made with any degree of certainty after the proportion of children in this sample who have learning difficulties in school is ascertained. It may be that the SRS, for example, identified all of the children who will have difficulty in school, and that the Brenner and CSU were, therefore, inefficient for this purpose.

Validity of Parent Screening

Means, standard deviations, and correlations for results from parents' and psychologist's administrations of the SRS are given in Table 10. Correlations are based upon the 43 children screened by both their parent and the psychologist. The correlations tend to be high, but do not fully reflect the close agreement

between the parents' and the psychologist's results because the range of scores on subtests was small. The largest standard deviation was 3.4 for a subtest. The means obtained by parents and the psychologist were practically identical. Inspection of individual records revealed that parents and psychologist usually recorded the same score for almost all items. Subscale scores were usually identical and seldom deviated by more than one or two points. In short, the parents gave highly valid screening results as measured by the agreement of results obtained concurrently by an experienced and impartial psychologist. (It is also of interest that there was little practice effect noted in the second administration of the SRS, whether the parents had given the first administration or the second administration.) Although it must be remembered that this sample is composed of middle and upper-middle class families and such valid results might not be obtained from parents of other backgrounds, the present results appear to be very supportive of the notion that parents do not give biased answers about their children if they are asked "good questions". The onus of unreliable reporting by parents has been commonly placed by clinicians who have, perhaps, asked parents very difficult or vague questions. How many of us, for example, could answer the question "When did your child begin to speak in sentences?", with any degree of accuracy? This type of question has frequently been asked of parents and has dismayed parent and data-seeker alike. It may be that, if we ask parents for observations of current behavior that has been clearly specified, that relatively inexpensive and valid information can be obtained for a variety of purposes. One of these purposes might well be that of obtaining screening data for early evidences of developmental difficulties. Conceivably, instruments such as the SRS and the Ready or Not could be devised

for a full age range from birth through five or six years and distributed en masse by a public agency to all parents in communities as the initial, gross screening technique. (This might be done with the aid of high school students who could locate families and assist parents who needed help in reading or understanding general purposes or specific tasks.) The costs of this approach, as contrasted to individual testing, even when well-organized by schools (Beery, 1967), would probably be less than $1.00 per child instead of $20 to $40. Those parents who returned results which indicated that they had children whose development was questionable could be contacted for more definitive screening and diagnosis so that early assistance planning could be made. Similarly, parents who failed to complete or return the parental screening instruments might constitute a "high risk" population which could be contacted more directly by child development specialists for further evaluation and possible participation in programs such as Head Start.

SUMMARY AND CONCLUSIONS

This investigation of screening instruments which might be used by pediatricians and others in identifying young children who might later experience difficulty in schoolwork was undertaken because (a) there appears to be a need to devise ways of accomplishing early identification of learning disabilities and (b) many pediatricians are looking for and using techniques for this purpose which have unsubstantiated validity. The purpose of the study is not to question the wisdom of the use of screening techniques for these purposes by pediatricians, although this practice may be questioned. Suffice it to say, that if pediatricians and others not formally connected with schools are to engage in these activities, they probably carry the burdens of (a) careful scrutiny and judgment in the selection of screening instruments, and (b) close and open communication with schools.

This report is an interim summary of relationships among results which were obtained concurrently. The children will be followed in school in order that study of the predictive validity of these results may be made.

A total of 100 preschool children between the ages of $3\frac{1}{2}$ and $5\frac{1}{2}$ years of age were screened for school "readiness" with a variety of instruments which included scales administered by pediatric nurses in the physicians' offices, scales administered by the childrens' own parents, a scale to be rated by the pediatrician in the course of his preschool physical examination, and scales administered by an experienced psychologist. The instruments used were The Brenner Developmental Gestalt Test of School Readiness, The Child Study Unit Screening Scales (CSU), The School Readiness Checklist (Ready or Not), The School Readiness Survey (SRS), The Sprigle School Readiness Screening Test, an informal rating

scale devised by pediatricians, and the Stanford-Binet Intelligence Test (Form L-M).

The sample was quite representative of the age groups designed for study, but was unrepresentative of the general population, as the children were (a) patients of private pediatricians, (b) children of families from middle to upper-middle class socio-economic backgrounds, and (c) of high-average intelligence on the average. Parental cooperation was excellent.

The Brenner results indicated that this instrument had a consistent and positive relationship with chronological age (CA) and relatively high agreement with mental age and overall results on other instruments. There was a lack of sex differences, which is viewed as a finding in favor of the Brenner. The categorization of 21% of the subjects as "unready" is a possible point in its favor. However, the scoring is judged to be awkward and unnecessary, the norms are restricted in age range (none for children 4½ years and younger), and the test is almost exclusively visual-motor in nature, so that potentially important auditory-vocal functions are only slightly tapped.

The author is undoubtedly biased in favor of the CSU scales because of his participation in their development. Most of the positive comments about the CSU that follow are related to factors upon which the CSU scales were intended to improve over existing screening scales, in particular the relatively wide age range (2½ to 6½ years), the variety and kinds of functions tapped, and the flexibility and brevity afforded by the provision of age-related items. The results of this study indicated that there were few sex differences and relatively high relationships with CA, MA, and other instruments. The categorization of 22% of the children as "unready" may or may not prove to be a point in the CSU's favor.

The CSU is in obvious need of further refinement and standardization. Some of the subscales did not display a satisfactory age progression with this sample.

The Ready or Not is inexpensive and is relatively simple for parents to administer and score. Results from this study indicated a moderate to fairly high relationship with CA, MA, and the other instruments used. However, the Ready or Not has a limited age range, seemed to be more discriminative among females, identified only 8% of the sample as "unready", and provides no subscale scores. It seemed that the scale is primarily tapping motor and general verbal functions and may not give sufficient weight to receptive functions.

The SRS is inexpensive, has instructions and a format which middle and upper-middle class parents seem able to use comfortably, has subscales which have face validity and relevance, and has good agreement with CA, MA, and the other instruments used in the study. It appears that the subscales may tap a general intelligence factor to a greater extent than the authors might have wished. This seems to be a promising instrument, although the age range is somewhat limited and its categorization of 10% of the sample as "unready" may be inadequate (but may prove to be quite accurate). The SRS has a section devoted to suggestions for assisting children in their learning. Such a provision is thought, generally, to be a point in favor of the SRS, although the tone and appropriateness of some of the suggestions are not entirely beyond criticism.

The Sprigle total score showed good agreement with CA, MA, and the results of the other instruments, but a serious question about the claims made in the Sprigle manual with regard to validity must be raised. The manual lists correlations of .95 and .96 between the Sprigle results and Binet IQ. This would imply

that the Sprigle results and IQ are essentially synonymous, whereas a correlation of only .54 between the Sprigle and the Binet IQ was found in this study. Instead of the better than 90% commonality among these two measures which is indicated in the Sprigle manual, there was only a 29% commonality among them in the present study, a percentage of agreement more in keeping with what one would anticipate on the basis of correlations between other readiness scales and IQ. Other Sprigle statistics will be replicated as the children in this sample progress in school, and it is anticipated that the reported predictive validity of the Sprigle will be similarly questioned, as the Sprigle manual reports statistics which would make it a surprisingly accurate predictor of academic achievement. Finally, the Sprigle subscales seem to be largely saturated with a general intelligence factor, the age range is somewhat restricted, and only 4% of the sample was identified as being "unready".

The Pediatricians' Rating Scale was informally devised and administered, but provided some interesting data. It is simple to use, and some of the items, perhaps particularly the Eye Wink, the Opposition of Thumb and Finger, and the Pencil Grasp, may have predictive value. The physicians' global prediction of 12% of the sample having learning difficulties may prove to be rather accurate and may suggest that more sophisticated evaluations are unnecessary for these purposes. The scale, as it now stands, seems to be primarily tapping motor and general intellectual factors. It seems doubtful that the laterality items will prove to be of predictive value.

The validity of parent screening was excellent, based upon the comparison of results from parent and psychologist's administration of the SRS on 43 children. This may be the most important finding of the study, as valid parent screening

may provide an economical and accurate means for screening large numbers of children at early ages if appropriate instruments and systems of distribution and retrieval can be devised.

We seem to need further development and investigation of instruments which will (a) allow screening of large numbers of young children at low cost, (b) provide some specificity of learning dysfunction, and (c) provide directions for ameliorative programs of assistance prior to school entrance. It may be, however, that a different kind of screening than has been conducted in this and other studies is needed. It may be far more productive to discover what a child does not know, attempt to teach him in specified ways, and then measure his learning, than to use static measurements such as these (Beery, 1967).

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Table 1

Chronological Age

Age Group[1]	Males		Females		Total	
	$\bar{X}$[2]	σ[3]	$\bar{X}$	σ	$\bar{X}$	σ
3-6	42.4	1.4	42.9	0.7	42.6	1.1
4-0	47.6	1.0	48.2	1.6	47.9	1.3
4-6	52.8	2.1	53.8	1.6	53.3	1.9
5-0	59.7	1.9	61.2	1.3	60.4	1.8
5-6	66.2	2.0	66.3	1.7	66.3	1.8
Total	53.5	8.6	54.5	8.7	54.0	8.6

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1 Expressed in years and months.
2 Mean age in months.
3 Standard deviation in months.

Table 2

Mental Age

Age Group	Males $\bar{X}$	Males σ	Females $\bar{X}$	Females σ	$\bar{X}$	σ
3-6	52.9	7.5	52.3	6.5	52.6	6.9
4-0	53.8	8.2	60.5**	5.7	57.1	7.7
4-6	59.1	4.3	63.2	11.1	61.1	8.5
5-0	67.9	5.7	68.4	6.1	68.1	5.8
5-6	75.1	4.9	74.9	5.6	75.0	5.1
Total	61.5	10.4	63.6	10.3	62.6	10.4

** Females greater than males at .05 level of statistical significance.

Table 2(b)

Intelligence Quotients

Age Group	Males		Females		Total	
	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ
3-6	120.6	15.5	117.6	13.1	119.1	14.1
4-0	110.8	16.5	122.0**	9.1	116.4	14.2
4-6	109.8	8.1	116.3	19.0	113.1	14.6
5-0	113.7	8.0	111.5	10.8	112.6	9.3
5-6	118.9	15.4	113.9	7.9	116.5	12.4
Total	114.8	13.4	116.3	12.7	115.5	13.0

* Males greater than females at .05 level
** Females greater than males at .05 level

Table 3(a)

Brenner Results

(Sexes Combined)

Age Group	Number Producing $\bar{X}$	Number Producing σ	Number Recognition $\bar{X}$	Number Recognition σ	10 Dot Gestalt $\bar{X}$	10 Dot Gestalt σ	Sentence Gestalt $\bar{X}$	Sentence Gestalt σ	Draw-a-Man $\bar{X}$	Draw-a-Man σ	BGT Total Score $\bar{X}$	BGT Total Score σ
4-6	1.5**	0.9	3.6	1.4	0.6	1.2	1.2	2.1	3.7**	2.9	21.4	12.2
5-0	2.0	1.1	4.6	1.6	1.3	1.9	6.5	3.0	6.0	2.2	44.7	17.3
5-6	2.5	0.8	5.5**	0.5	4.7	1.5	8.4	3.0	6.4	1.8	61.1	12.6
Total	2.0	1.0	4.6	1.5	1.5	2.0	5.6	3.9	5.5#	2.5	42.8	20.9

** Females greater than males at 0.05 level of statistical significance.

Females greater than males at 0.01 level of statistical significance.

Table 3(b)

Intercorrelations

Brenner Results

(Sexes Combined)

	Number Producing	Number Recognition	10 Dot Gestalt	Sentence Gestalt	Draw-a Man	Total Right	BGT
Chronological Age	0.39	0.48	0.60	0.69	0.48	0.72	.74
Mental Age	0.47	0.63	0.53	0.65	0.50	0.74	.75
CSU Scales IQ :	.37	.50	.11	.31	.30	.41	.40
Auditory	0.22	0.45	0.34	0.53	0.15	0.43	.41
Visual	0.36	0.46	0.02	0.37	0.08	0.48	.41
Auditory-Vocal	0.46	0.42	0.40	0.47	0.30	0.52	.53
Visual-Motor	0.56	0.43	0.54	0.66	0.42	0.64	.69
Vocal	0.32	0.60	0.12	0.57	0.23	0.49	.50
Motor	0.51	0.50	0.09	0.51	0.60	0.60	.61
Total	0.58	0.66	0.42	0.74	0.41	0.75	.75
Brenner							
Total Right	0.78	0.65	0.66	0.89	0.69	1.00	.98
BGT	0.79	0.70	0.66	0.88	0.72	0.98	1.00
Ready or Not	0.35	0.53	0.19	0.38	0.21	0.42	.46
SRS - Parents Scoring	0.54	0.31	0.27	0.55	0.52	0.61	.62
Physicians Ratings							
Academic Prognosis	0.44	0.33	-0.61	0.31	0.19	0.26	.26
Social Prognosis	0.23	0.04	-0.29	0.46	0.33	0.30	.30
Total	0.45	0.45	-0.35	0.60	0.21	0.49	.46

Table 4(a)

CSU Results

(Sexes Combined)

Age Group	Auditory $\bar{X}$	Auditory σ	Visual $\bar{X}$	Visual σ	Auditory-Vocal $\bar{X}$	Auditory-Vocal σ	Visual-Motor $\bar{X}$	Visual-Motor σ	Vocal $\bar{X}$	Vocal σ	Motor $\bar{X}$	Motor σ	Total $\bar{X}$	Total σ
3-6	11.5	3.0	8.2	2.5	11.0	3.9	3.6	3.4	7.3	3.0	10.4	9.6	49.8	11.4
4-0	12.6	3.5	8.6	2.0	11.3**	5.6	6.0**	4.6	8.4	3.9	9.2	2.4	56.1**	14.0
4-6	11.7	4.2	10.0	2.9	11.1	5.2	7.7	4.5	8.0	4.0	9.5	2.1	59.1	15.0
5-0	15.0	2.6	11.4	3.3	14.7	2.3	11.1	4.1	12.1	3.6	11.6	1.9	76.1	12.2
5-6	15.6	1.8	13.6	3.3	15.7	2.6	13.5	4.1	12.8*	3.2	12.5	2.2	83.7	9.5
Total	13.3	3.5	10.3	3.4	12.7	4.6	8.3	5.4	9.7	4.1	10.6**	4.8	64.8	17.6

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* Males greater than females at 0.05 level of statistical significance.

** Females greater than males at 0.05 level of statistical significance.

Table 4(b)

Intercorrelations

CSU Results

(Sexes Combined)

	Auditory	Visual	Auditory-Vocal	Visual-Motor	Vocal	Motor	Total
Chronological Age	0.49	0.48	0.43	0.58	0.48	0.58	0.68
Mental Age	0.57	0.49	0.54	0.62	0.63	0.58	0.77
CSU Scales IQ:	.37	.20	.38	.35	.44	.22	.45
Auditory	1.00	0.46	0.30	0.56	0.74	0.33	0.75
Visual		1.00	0.30	0.35	0.44	0.43	0.67
Auditory-Vocal			1.00	0.39	0.46	0.35	0.69
Visual-Motor				1.00	0.48	0.47	0.76
Vocal					1.00	0.42	0.81
Motor						1.00	0.63
Total							1.00
Brenner							
Total Right	0.43	0.48	0.52	0.64	0.49	0.60	0.75
BGT	0.43	0.41	0.53	0.69	0.50	0.61	0.75
Sprigle	0.57	0.53	0.52	0.58	0.66	0.56	0.81
Ready or Not	0.26	0.28	0.55	0.42	0.39	0.51	0.58
SRS - Parents Scoring	0.35	0.21	0.47	0.49	0.53	0.60	0.59
Physicians Ratings							
Academic Prognosis	0.36	0.41	0.34	0.43	0.44	0.66	0.55
Social Prognosis	0.04	0.25	0.27	0.27	0.22	0.25	0.31
Total	0.50	0.57	0.59	0.48	0.63	0.66	0.76

Table 5(a)

Ready or Not Results

Age Group	Males		Females		Total	
	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ
4-6	34.1	4.7	36.4	6.3	35.2	5.4
5-0	40.2	1.6	36.8	3.1	38.4	3.0
5-6	40.6	2.4	40.9	2.0	40.7	2.1
Total	38.1	4.4	38.0	4.4	38.1	4.3

Table 5(b)

Intercorrelations

Ready or Not Results

	Males	Females	Total
Chronological Age	.62	.38	.49
Mental Age	.61	.72	.66
IQ:	.34	.55	.46
CSU Scales			
Auditory	.26	.28	.26
Visual	.13	.40	.28
Auditory-Vocal	.59	.54	.55
Visual-Motor	.54	.30	.42
Vocal	.42	.37	.39
Motor	.65	.45	.51
Total	.59	.57	.58
Brenner			
Total Right	.57	.32	.42
BGT	.59	.30	.46
Sprigle	.65	.85	.75
Ready or Not	1.00	1.00	1.00
SRS (Parents)	.73	.74	.73
Physicians Ratings			
Academic Prognosis	.33	.76	.59
Social Prognosis	-.17	.55	.21
Total	.06	.76	.50

Table 6(a)

SRS Results, Parents Scoring

(Sexes Combined)

Age Group	Number Concepts $\bar{X}$		Discrim. of Forms $\bar{X}$		Color Naming $\bar{X}$		Symbol Matching $\bar{X}$		Speaking Vocab. $\bar{X}$		Hearing Vocab. $\bar{X}$		General Info. $\bar{X}$		Total Survey $\bar{X}$	
4-6	6.1	3.1	8.8	2.3	5.6	2.2	11.6	15.0	14.5	2.5	10.2	1.3	15.5	3.5	72.4	15.4
5-0	8.1	2.1	9.6	1.0	6.9	0.3	14.4	1.7	15.8	2.0	10.9	1.3	17.7	2.1	83.3	6.5
5-6	9.3	1.0	9.9	1.2	6.1	1.6	15.4	0.8	16.3	2.0	12.0	1.4	18.2	1.4	86.9	5.6
Total	7.8	2.5	9.4	1.6	6.2	1.6	13.8	3.4	15.5	2.2	11.1	1.5	17.2	2.7	81.1	11.5

Table 6(b)

Intercorrelations

SRS Results, Parents Scoring

(Sexes Combined)

	Number Concepts	Discrim. of forms	Color Naming	Symbol Matching	Speaking Vocab.	Hearing Vocab.	General Info.	Total Survey
Chronological Age	0.57	0.27	0.18	0.48	0.20	0.45	0.40	0.50
Mental Age	0.60	0.54	0.37	0.62	0.35	0.55	0.66	0.71
CSU Scales IQ:	.29	.47	.30	.39	.35	.35	.52	.52
Auditory	0.35	0.20	0.08	0.17	0.35	0.29	0.29	0.35
Visual	0.27	0.19	0.01	0.22	0.03	0.32	0.10	0.21
Auditory-Vocal	0.44	0.50	0.11	0.41	0.15	0.29	0.48	0.47
Visual-Motor	0.55	0.31	0.27	0.43	0.56	0.41	0.43	0.49
Vocal	0.39	0.48	0.25	0.35	0.50	0.26	0.46	0.53
Motor	0.71	0.41	0.52	0.54	0.09	0.41	0.43	0.60
Total	0.62	0.51	0.22	0.47	0.25	0.44	0.51	0.59
Brenner								
Total Right	0.59	0.14	0.42	0.44	0.25	0.54	0.48	0.61
BGT	0.63	0.15	0.46	0.45	0.19	0.55	0.48	0.62
Sprigle	0.65	0.67	0.39	0.71	0.42	0.43	0.76	0.77
Ready or Not	0.53	0.65	0.30	0.71	0.35	0.35	0.68	0.73
SRS - Parents Scoring	0.73	0.79	0.58	0.88	0.59	0.52	0.91	1.00
Physicians Ratings								
Academic Prognosis	0.36	0.46	0.34	0.50	0.31	0.48	0.52	0.55
Social Prognosis	0.34	0.21	0.24	0.09	-0.06	0.38	0.38	0.27
Total	0.39	0.50	0.36	0.41	0.29	0.30	0.54	0.52

Table 7(a)

Sprigle Results

(Sexes Combined)

Age Group	Verbal Comp		Size Relations		Visual Discrim		Reasoning		Understanding of Numbers		Information		Analogies		Vocabulary		Spatial Relations		Total	
	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ
4-6	2.1	0.9	2.6	1.0	2.9	1.3	1.9	0.6	1.7	1.3	2.1	1.2	2.0	1.0	3.0	1.4	2.2	0.8	20.4	5.5
5-0	2.4	0.5	2.4	1.0	2.9	1.3	2.4**	0.5	1.9	1.1	1.7*	1.0	2.0	0.8	2.4	1.0	3.0	0.0	21.1	2.9
5-6	2.7	0.5*	3.1	0.9	4.5	0.7	2.4	0.5	2.5	0.9	2.8	0.9	2.6	0.8	2.8	0.8	2.8	0.6	26.6	3.1
TOTAL	2.4	0.7	2.7	1.0	3.5	1.3	2.2	0.6	2.1	1.1	2.3	1.1	2.3	0.9	2.8**	1.0	2.7	0.7	23.1	4.8

* Males greater, .05 level
** Females greater, .05 level

Table 7(b)

Inter-correlations

Sprigle

	Verbal Comp	Size Relations	Visual Discrim	Reasoning	Understanding of Numbers	Information	Analogies	Vocabulary	Spatial Relations	Total
Chronological Age	0.33	0.28	0.48	0.39	0.37	0.38	0.33	0.02	0.32	0.60
Mental Age	0.58	0.31	0.56	0.26	0.00	0.52	0.41	0.29	0.46	0.80
CSU Scales	0.52	0.26	0.25	0.14	0.40	0.32	0.32	0.38	0.29	0.54
Auditory	0.49	0.34	0.50	0.43	0.29	0.11	0.38	0.20	0.14	0.57
Visual	0.17	0.37	0.32	0.26	0.35	0.27	0.41	0.17	0.14	0.53
Auditory-Vocal	).28	0.57	0.19	0.35	0.42	0.21	0.39	-0.19	0.50	0.52
Visual-Motor	0.38	0.00	0.30	0.25	0.47	0.55	0.39	0.16	0.21	0.58
Vocal	0.54	0.47	0.35	0.37	0.42	0.28	0.54	-0.01	0.31	0.66
Motor	0.20	0.10	0.30	0.38	0.69	0.38	0.24	0.09	0.18	0.56
Total	0.48	0.49	0.43	0.44	0.60	0.45	0.59	0.08	0.34	0.81
Sprigle	0.63	0.56	0.62	0.39	0.70	0.50	0.60	0.31	0.46	1.00
Ready or Not	0.64	0.32	0.27	0.45	0.76	0.34	0.53	0.15	0.39	0.75
SRS - Parents Scor.	0.65	0.36	0.37	0.52	0.70	0.38	0.48	0.10	0.47	0.77
Physicians Ratings										
Academic Prognosis	0.79	0.19	0.49	0.30	0.61	0.23	0.71	0.61	0.26	0.81
Social Prognosis	0.27	-0.02	0.34	-0.08	0.25	0.20	0.35	0.66	0.73	0.56
Total	0.39	0.52	0.68	0.40	0.78	0.43	0.59	0.23	0.46	0.89

Table 8(a)

PHYSICIANS PRE-SCHOOL EXAM APPRAISAL

All Males and Females Combined
(N = 25)

1.	Laterality						
	Raise right hand	Pass	13	Fail	12		
	Stand on Left Foot	Pass	12	Fail	13		
	Touch right hand to left ear	Pass	10	Fail	15		
	Touch left hand to right knee	Pass	10	Fail	15		
2.	Pencil grasp	Excellent	16	Fair	6	Poor	2
3.	Heel-toe straight line walking	Excellent	14	Fair	8	Poor	2
4.	Opposition of thumb to fingers	Excellent	10	Fair	7	Poor	8
5.	Ability to wink one eye at a time	Excellent	10	Fair	8	Poor	7
6.	Facility in performing visual acuity and audiometric tests	Excellent	13	Fair	6	Poor	1
7.	Estimate of childs academic position from kindergarten through 2nd grade						
	Superior 4	Above Average	11	Average	7	Below Average 2	Failure 1
8.	Estimate of childs ability to make social adjustment to school	Excellent	20	Fair	5	Poor	0
9.	Total Score*: Mean - 37.0 S.D. = 12.1						

Comment: (a) Items 1 (all parts), 6, 7, 8 unlikely to be of screening value
(b) Items 2 and 3 may be of value and very accurate (males lagging)
(c) Items 4 and 5 (poor rating) would seem to be most valuable candidates, along with Total score cutoff (males lagging)

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* Total Score: 5 points = Pass, Excellent, Superior
4 points = Above average
3 points = Average, Fair
2 points = Below average
1 point = Fail, Poor

Table 8(b)

PHYSICIANS PRE-SCHOOL EXAM APPRAISAL

All Males
(N = 12)

1. Laterality

Raise right hand	Pass 5	Fail 7
Stand on left foot	Pass 3	Fail 9
Touch right hand to left ear	Pass 3	Fail 9
Touch left hand to right knee	Pass 3	Fail 9

2. Pencil grasp	Excellent	6	Fair	4	Poor	2
3. Heel-toe straight line walking	Excellent	5	Fair	6	Poor	1
4. Opposition of thumb to fingers	Excellent	2	Fair	4	Poor	1
5. Ability to wink one eye at a time	Excellent	4	Fair	4	Poor	4
6. Facility in performing visual acuity and audiometric tests	Excellent	5	Fair	4	Poor	0

7. Estimate of childs academic position from kindergarten through 2nd grade

Superior	1	Above Average	4	Average	5	Below Average	2	Failure	0

8. Estimate of childs ability to make social adjustment to school	Excellent	9	Fair	3	Poor	0

9. Total Score: Mean = 32.6 S.D. = 10.8

Comment: (a) Males 10 points below females
(b) Males lagging in all (motor) areas, including Item #1
(c) Sex differences not due to ages, as only 1 more 4½ year male, and only 2 less 5½ year males (same number of 5 year males as females)

Table 8(c)

PHYSICIANS PRE-SCHOOL EXAM APPRAISAL

All Females
(N = 13)

1. Laterality

Raise right hand	Pass 8	Fail 5
Stand on Left Foot	Pass 9	Fail 4
Touch right hand to left ear	Pass 7	Fail 6
Touch left hand to right knee	Pass 7	Fail 6

2.	Pencil grasp	Excellent	10	Fair	2	Poor	0
3.	Heel-toe straight line walking	Excellent	9	Fair	2	Poor	1
4.	Opposition of thumb to fingers	Excellent	8	Fair	3	Poor	2
5.	Ability to wink one eye at a time	Excellent	6	Fair	4	Poor	3
6.	Facility in performing visual acuity and audiometric tests	Excellent	8	Fair	2	Poor	1

7. Estimate of childs academic position from kindergarten through 2nd grade

Superior	3	Above Average	7	Average	2	Below Average	0	Failure	1

8.	Estimate of childs ability to make social adjustment to school	Excellent	11	Fair	2	Poor	0

9. Total Score: Mean = 41.0 S.D. = 12.3

Table 8(d)

Pediatrician's Rating Scales
Inter-correlations

Sexes Combined (Ages 4-6 through 5-6)

	1a	1b	1c	1d	2	3	4	5	6	7	8	Total
Chronological Age	.14	.38	.43	.28	.45	.38	.10	.00	.08	.06	.08	.36
Mental Age	.37	.55	.37	.48	.51	.38	.32	.22	.41	.43	.40	.58
IQ	.31	.30	.06	.31	.22	.12	.31	.27	.43	.52	.42	.38
CSU Scales												
Auditory	.28	.36	.31	.28	.60	.27	.21	.27	.49	.36	.04	.50
Visual	.11	.30	.48	.42	.47	.54	.37	.36	.36	.41	.25	.57
Auditory-Vocal	.55	.55	.44	.44	.35	.53	.04	.13	.57	.34	.27	.59
Visual-Motor	.27	.40	.31	.33	.51	.40	.18	.23	.31	.43	.28	.48
Vocal	.52	.56	.47	.49	.36	.45	.29	.25	.42	.44	.22	.63
Motor	.38	.55	.59	.53	.54	.38	.46	.15	.36	.66	.25	.66
Total	.51	.63	.60	.58	.55	.56	.28	.33	.55	.55	.31	.76
Sprigle	.43	.57	.46	.60	.73	.59	.62	.60	.57	.81	.56	.89
Ready or Not	.27	.32	.24	.24	.62	.29	.31	.16	.46	.59	.21	.50
SRS - Parents Scor.	.39	.36	.30	.30	.60	.34	.34	.11	.43	.55	.27	.52
Brenner	.40	.59	.60	.60	.44	.15	.16	-.20	.30	.26	.30	.50
Ped. 1a	1.00	.76	.62	.62	.27	.49	.28	.14	.29	.34	.12	.72
1b	.76	1.00	.85	.85	.32	.54	.29	.25	.31	.39	.28	.84
1c	.62	.85	1.00	.84	.33	.53	.41	.08	.27	.42	.20	.83
1d	.62	.85	.83	1.00	.33	.42	.41	.28	.27	.42	.41	.82
2	.27	.32	.33	.33	1.00	.31.	.41	.33	.50	.52	-.07	.58
3	.49	.53	.53	.42	.31	1.00	.42	.21	.35	.42	.28	.70
4	.28	.29	.41	.41	.41	.42	1.00	.22	.23	.62	.17	.60
5	.14	.25	.08	.28	.33	.21	.22	1.00	.15	.36	.20	.40
6	.29	.31	.27	.27	.50	.35	.23	.15	1.00	.59	.29	.56
7	.34	.39	.42	.42	.52	.42	.62	.36	.59	1.00	.41	.71
8	.12	.28	.20	.41	-.06	.28	.17	.20	.29	.41	1.00	.39
Total	.72	.84	.83	.82	.58	.70	.60	.40	.56	.71	.39	1.00

* These are technically inappropriate statistics (Pearson r's) which were computed for convenience and as <u>indications</u> of relationships only.

Table 9

Numbers and Proportions of Children
Between Ages 4-6 and 5-6 Classified as "Not Ready"

	Brenner	CSU	Parent Ready or Not	Sprigle	Parent SRS	Pediatricians Ratings: Ach.
Classification	"Low"	"Low"*	"Doubtful" or "Uncertain"	"Questionable" or "Not Ready"	"Needs to Develop"	"Below Average" or "Poor"
Classification Cutoff Scores	24 or less	62 or less	30 or less	9 or less	69 or less	- - - -
Number Classified	6	13	4	1	5	3
Number Screened	28	59	52	27	51	25
Proportion Classified	21%	22%	8%	4%	10%	12%

* Tentative cutoff score is the raw score for the 4-3 age norm (i.e. six months or more below the youngest CA, 4-9, permitted by California law for kindergarten entrance.)

Table 10

Parent Versus Psychologist Results

School Readiness Survey

(Sexes and Ages, 4-6 and older, Combined)

Subtest	Parents (N = 51)		Parent-Psych. Correlation	Psychologist (N = 43)	
	$\bar{X}$	σ	r	$\bar{X}$	σ
Number Concepts	7.8	2.5	.75	7.7	2.5
Discrimination of Forms	9.4	1.6	.79	9.5	1.9
Color Naming	6.2	1.6	.74	6.4	1.2
Symbol Matching	13.8	3.4	.79	14.1	2.8
Speaking Vocabulary	15.5	.22	.68	15.3	2.2
Hearing Vocabulary	11.1	1.5	.29	11.1	1.1
General Information	17.2	2.7	.71	17.1	2.7
TOTAL SURVEY	81.1	11.5	.84	81.4	11.1

* Difference between parents and psychologists' means significant at .05 level of statistical significance.